

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

CRYSTAL et al.

Group Art Unit: unassigned

Application No.

Examiner: unassigned

Filing Date: August 27, 2003

For: GENETIC VACCINES DIRECTED
AGAINST BACTERIAL EXOTOXINS

SUBMISSION OF SEQUENCE LISTING

MS Patent Application
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In accordance with the requirements of 37 C.F.R. §§ 1.821-1.825, a sequence listing is being submitted with respect to the instant patent application. A paper copy of the sequence listing and a computer readable copy of the sequence listing on computer diskette (PatentIn v.3.2) are enclosed herewith. The undersigned hereby verifies that the contents of the paper and the computer readable copies, as concurrently being submitted, are the same.

Respectfully submitted,



Melissa E. Kolom, Registration No. 51,860
LEYDIG, VOIT & MAYER, LTD.
Two Prudential Plaza, Suite 4900
180 North Stetson
Chicago, Illinois 60601-6780
(312) 616-5600 (telephone)
(312) 616-5700 (facsimile)

Date: August 27, 2003

216474.ST25
SEQUENCE LISTING

<110> Crystal, Ronald G
Hackett, Neil R
Tan, Yadi

<120> GENETIC VACCINES DIRECTED AGAINST BACTERIAL EXOTOXINS

<130> 216474

<160> 3

<170> PatentIn version 3.2

<210> 1
<211> 2295
<212> DNA
<213> Artificial

<220>
<223> Synthetic B. anthracis gene for protective antigen with
human-preferred codons

<400> 1
atgaagaagc gcaaggtgct gateccccctg atggccttgt ccaccatcct ggtgtccagc 60
accggcaacc tcgaggtgat ccaggccgag gtgaagcagg agaaccggct gctgaacgag 120
tccgagtgca gctccccagg gctgctgggc tactacttca gcgacttgaa cttccaggcc 180
cctatggtag tgacctctct caccaccggg gacctgtcca tccccagctc cgagctggag 240
aacatccctc ccgagaacca gtacttcag tccgccatct ggtccggctt catcaaggtg 300
aagaagagcg acgagtacac cttcgccacc tccgccgaca accacgtgac catgtgggtg 360
gacgaccagg aggtgatcaa caaggcctcg aattccaaca agatccgctt ggagaagggc 420
cgctgttacc agatcaagat ccagtaccag cgcgagaacc ccaccgagaa gggcttggac 480
ttcaagttgt actggaccga ctcccagaac aagaaggagg tgatctccag cgacaacctc 540
cagctgcccc agctgaagca gaagtcctcc aactcccgca agaagcgagc caccagcgcc 600
ggccccaccg tgccccgacc cgacaacgac ggcacccccg actccctgga ggtggagggc 660
tacaccgtgg acgtcaagaa caagcgacc ttctgtgtcc cctggatctc caacatccac 720
gagaagaagg gcctgaccaa gtacaagtcc tccccgaga agtggagcac cgctccgac 780
ccgtacagcg acttcgagaa ggtgaccggc cggatcgaca agaacgtgtc ccccgaggcc 840
cgccaccccc tggtgggcgc ctaccgata gtgcacgtgg acatggagaa catcatctc 900
tccaagaacg aggaccagtc caccagaac accgacagcc agaccgcgac catcagcaag 960
aacacctcca ccagcaggac ccacaccagc gaggtgcacg gcaacgccga ggtgcacgcg 1020
tcctttcttg acatcggcgg gagcgtgtcc gccgggttca gcaactccaa ctccagcaac 1080
gtcgccatcg accactccct gtccctggcc ggggagcgca cctgggcca gacctgggc 1140
ctgaacaccg ccgacaccgc ccgctgaac gccaatatcc gctacgtgaa caccgggacc 1200
gccccatct acaactgtct gccaccacc tccctggtgc tgggcaagaa ccagaccctc 1260
gcgaccatca aggccaagga gaaccagctg agccagatcc tggcccccaa caactactat 1320

216474.ST25

ccctccaaga	acttgccgcc	catcgccctg	aacgcccagg	acgacttcag	ctccaccccc	1380
atcaccatga	actacaacca	gttcctggag	ctggagaaga	ccaagcagct	gcgcctggac	1440
accgaccagg	tgtacgggaa	catcgccacc	tacaacttcg	agaacggcgg	cgtaggggtg	1500
gacaccggat	ccaactggag	cgaggtgctg	ccgcagatcc	aggagaccac	cgcccgcatac	1560
atcttcaacg	gcaaggacct	gaacctgggt	gagaggcgga	tcgcggcggt	gaaccccagc	1620
gacccccctg	agaccacca	gccggacatg	accctgaagg	aggccctgaa	gatcgccctc	1680
ggcttcaacg	agccgaacgg	caacctccag	taccagggga	aggacatcac	cgagttcgac	1740
ttcaacttcg	accagcaaac	ctcccagaac	atcaagaacc	agctggcgga	gctgaacgtg	1800
accaacatct	acacctgtct	ggacaagatc	aagctgaacg	ccaagatgaa	catctgtatc	1860
cgcgacaagc	gcttccacta	cgaccgaac	aacatcgccg	tggggggccga	cgagtcctgt	1920
gtgaaggagg	cccaccgcga	ggtgatcaac	tcctccaccg	agggcctggt	gctgaacatc	1980
gacaaggata	tcgcgaagat	cctgtccggc	tacatcgtag	agatcgagga	caccgagggg	2040
ctgaaggagg	tgatcaacga	ccgctacgac	atgttgaaca	tctccagcct	gcggcaggac	2100
ggcaagacct	tcatcgactt	caagaagtac	aacgacaagc	tgccgctgta	catcagcaac	2160
cccaactaca	aggtgaacgt	gtacgccgtg	accaaggaga	acaccatcat	taaccccagc	2220
gagaacgggg	acaccagcac	caacgggatc	aagaagatcc	tgatcttttc	gaagaagggc	2280
tacgagatcg	gctaa					2295

<210> 2
 <211> 2430
 <212> DNA
 <213> Artificial

<220>
 <223> synthetic B. anthracis gene for lethal factor with
 human-preferred codons

<400> 2						
atgaacatca	agaaggagtt	catcaagggt	atcagcatgt	cctgtctggt	gaccgccatc	60
accttgagcg	gccccgtctt	catccccctg	gtgcagggtg	ccggcgccca	tggtagcgtg	120
ggcatgcatg	tgaaggagaa	ggagaagaac	aaggacgaga	acaagcgcaa	ggacgaggag	180
cgcaacaaga	cccaggagga	gcacctgaag	gagatcatga	agcacatcgt	gaagatcgag	240
gtgaaggggg	aggaggccgt	gaagaaggag	gccgccgaga	agctgtctgga	gaaggtgccc	300
tccgacgtgc	tggagatgta	caaggccatc	ggcggcaaaa	tctacatcgt	ggacggcgac	360
atcaccaagc	acatctccct	ggaggccctg	tccgaggaca	agaagaagat	caaggacatc	420
tacgggaagg	acgccctgct	gcacgagcac	tacgtgtacg	ccaaggaggg	ctacgagccc	480
gtgtcgtgta	tccagtcctc	ggaggactac	gtggagaaca	ccgagaaggc	cctgaacgtg	540
tactacgaga	tcggcaagat	cctgtccagg	gacatcctga	gcaagatcaa	ccagccctac	600
cagaagtctc	tggacgtgct	gaacaccatc	aagaacgcct	cgcactccga	cggccaggac	660

216474.ST25

ctgctgttca ccaaccagct gaaggagcac cccaccgact tctccgtgga attcctggag	720
cagaacagca acgaggtgca ggaggtgttc gcgaaggcct tcgcctacta catcgagccc	780
cagcaccgcg acgtgctcca gctgtacgcc ccggaggcct tcaactacat ggacaagttc	840
aacgagcagg agatcaacct gtccttggag gagctgaagg accagcggat gctgtccgcg	900
tacgagaagt gggagaagat caagcagcac taccagcact ggagcgactc cctgtccgag	960
gagggccgcg gcctgctgaa gaagctccag atccccatcg agcccaagaa ggacgacatc	1020
atccactccc tgtccagga ggagaaggag ctgctgaagc gcatccagat cgacagcagc	1080
gacttctgt ccaccgagga gaaggagtgc ctgaagaagc tccagatcga catccgcgac	1140
tccctgtccg aggaggagaa ggagctgctg aaccgcattc aggtggacag cagcaacccc	1200
ctgtccgaga aggagaagga gttcctgaag aagctgaagc tggatatcca gccctacgac	1260
atcaaccaga ggctccagga caccggcggg ctgatcgaca gcccgctcat caactggac	1320
gtgcgcaagc agtacaagag ggacatccag aacatcgacg cctgtctgca ccagtccatc	1380
ggcagcacc tgtacaacaa aatctacctg tacgagaaca tgaacatcaa caactgacc	1440
gccaccttgg gcgcggaact ggtggacttc accgacaaca ccaagatcaa ccgcggcac	1500
ttcaacgagt tcaagaagaa ctccaagtac agcatctcca gcaactacat gatctggag	1560
atcaacgaga gccccgcctt ggacaacgag cgcttgaagt ggcgcattcca gctgtccccc	1620
gacaccgcg ccggtctacct ggagaacggc aagctgatcc tccagcgcaa catcggcctg	1680
gagatcaagg acgtgcagat catcaagcag tccgagaagg agtacatcag gatcgacgcg	1740
aagggtgtgc ccaagagcaa gatcgacacc aagatccagg aggccagct gaacatcaac	1800
caggagtgga acaaggccct ggggtgtccc aagtacacca agcttatcac ctccaacgtg	1860
cacaaccgct acgcctccaa catcgtggag agcgcttacc tgatcctgaa cgagtggaag	1920
aacaacatcc agagcgacct gatcaagaag gtgaccaact acctggtgga cggaacggc	1980
cgcttctgtg taccgacat caccctccc aacatcgccg agcagtacac ccaccaggac	2040
gagatttacg agcaggtgca ctccaagggg ctgtacgtgc ccgagtcctg ctccatctg	2100
ctccacggcc cctccaaggg cgtggagctg aggaacgaca gcgagggctt catccagag	2160
ttcggccacg ccgtggacga ctacgcccgc tacctgtctg acaagaacca gtccgacctg	2220
gtgaccaact ccaagaagtt catcgacatc ttcaaggagg aggggagcaa cctgacctcg	2280
tacgggcgca ccaacgaggg ggagttcttc gccgaggcct tcaggctgat gcactccacg	2340
gaccacgccc agcgcttgaa ggtgcagaag aacgccccga agaccttcca gttcatcaac	2400
gaccagatca agttcatcat taattcctag	2430

<210> 3
 <211> 2403
 <212> DNA
 <213> Artificial

<220>

<223> Synthetic B. anthracis gene for edema factor with human-preferred codons

<400> 3

atgaccgcga	acaagttcat	ccccaacaag	ttcagcatca	tctccttctc	ctgtgctgtg	60
ttcgccatct	cctcctccca	ggcgatcgag	gttaacgcc	tgaacgagca	ctacaccgag	120
agcgacatca	agcgaacca	caagaccgag	aagaacaaga	ccgagaagg	gaagttaag	180
gacagcatca	acaacctggt	gaagaccgag	ttaccaacg	agaccttgg	caagatccag	240
cagaccagg	acctgctgaa	gaagatcccc	aaggacgtgc	tggaaatcta	cagcgagctg	300
ggcggcgaga	tttacttcac	cgacatcgac	ctggtggagc	acaaggagct	gcaggacctg	360
agcgaggagg	agaagaacg	catgaacagc	cgcggcgaga	aggtgccgtt	cgcctccgc	420
ttcgtgttcg	agaagaagag	ggagaccccc	aagctgatca	tcaacatcaa	ggactacgcc	480
atcaacagcg	agcagagcaa	ggagggttac	tacgagatcg	gcaaggggat	ctccctggac	540
atcatcagca	aggacaagtc	ctggaccccc	gaattcctga	acctgatcaa	gagcctgagc	600
gacgacagcg	acagcagcga	cctgctgttc	agccagaagt	tcaaggagaa	gctggagctg	660
aacaacaaga	gcattcgacat	caacttcac	aaggagaacc	tgaccgagtt	ccagcagcgc	720
ttctccctgg	cgttctccta	ctacttcgcc	cccgaaccac	gcacggtgct	ggagctgtac	780
gcccccgaca	tgttcgagta	catgaacaag	ctggagaagg	ggggcttcga	gaagatcagc	840
gagagcctga	agaaggaggg	cgtggagaag	gacaggatcg	acgtgctgaa	gggcgagaag	900
gcccctgaagg	cctccggcct	ggtgcccgag	cacgccgagc	ccttcaagaa	gatcgccgc	960
gagctgaaca	cctacatcct	gttcaggccc	gtgaacaagc	tggccaccaa	cctgatcaag	1020
agcggcgtgg	ccaccaaggg	cctgaacgtg	cacggcaaga	gctcggactg	gggccccgtg	1080
gccggctaca	tccccttcga	ccaggacctg	tccaagaagc	acggccagca	gctggccgtc	1140
gagaagggca	acctggagaa	caagaagtcc	atcaccgagc	acgagggcga	gatcggcaag	1200
atccccctga	agctggacca	cctgcgcac	gaggagctga	aggagaacgg	gatcatcctg	1260
aagggaaga	aggagatcga	caacggcaag	aagtactacc	tgctggagtc	gaacaaccag	1320
gtgtacgagt	tccgcacatg	cgacgagaac	aacgaggtgc	agtacaagac	caaggagggc	1380
aagataccg	tgtctggggg	gaagttcaac	tggcgcaaca	tcgaggtgat	ggccaagaac	1440
gtggaggggg	tcttgaagcc	gctgaccgcc	gactacgacc	tgttcgcctt	ggccccagc	1500
ctgaccgaga	tcaagaagca	gatccccag	aaggagtggg	acaagtggtt	gaacaccccc	1560
aactccctgg	agaagcagaa	ggcggtgacc	aacctgctga	tcaagtacgg	catcgagaag	1620
aagccggact	ccaccaaggg	cacctgttcc	aactggcaga	agcagatgct	ggaccgcctg	1680
aacgagggcc	tcaagtacac	cggtacacc	gggggggagc	tggtaacca	tggcaccgag	1740
caggacaacg	aggagttccc	cgagaaggac	aacgaaatct	tcattcatcaa	ccccgagggc	1800
gagttcatcc	tgaccaagaa	ctgggagatg	accggccgct	tcattcgagaa	gaacatcacg	1860

216474.ST25

ggcaaggact	acctgtacta	cttcaaccgc	tcctacaaca	agatcgcccc	cggaacaag	1920
gcctacatcg	agtggaaccga	cccgatcacc	aaggccaaga	tcaacacccat	ccccacgtcc	1980
gccgagttca	tcaagaacct	gtccagcatc	cgccgctcct	ccaacgtggg	cggtgtacaag	2040
gacagcggcg	acaaggacga	gttcgccaag	aaggagagcg	tgaagaagat	cgccgggtac	2100
ctgtccgact	actacaactc	cgccaaccac	atcttctccc	aggagaagaa	gcgcaagatt	2160
tccatcttcc	gcggcatcca	ggcctacaac	gagatcgaga	acgtgctgaa	gtccaagcag	2220
atcgcccccg	agtacaagaa	ctacttccag	tacctgaagg	agaggatcac	caaccagggtg	2280
cagctgctgc	tgaccaccca	gaagtccaac	atcgagttca	agctgctgta	caagcagctg	2340
aacttcaccg	agaacgagac	ggacaacttc	gaggtcttcc	agaagatcat	cgatgagaag	2400
tga						2403